Amendments to the Specification

Please replace page 1 of the original specification filed in the above captioned divisional application 10/668,531 with the substitute page 1 submitted herewith that has been marked to show corrections.

No new matter has been added to the substitute specification, but the granted patent number of the related parent patent has been substituted for the serial number. The description of the related application has been moved and inserted before the section marked "Background of the Invention" rather than after this section.

This application is a divisional application having priority in U.S. Patent Number 6,679,758 B2, granted January 20, 2005.

Background of the Invention

~~This application is a divisional application having priority in U.S. Serial Number 10/120,969, filed April 11, 2003.~~

The invention relates to bonded abrasive articles or grinding tools made porous by the use of certain agglomerated abrasive grains and to methods for making the agglomerated abrasive grains.

Grinding tools are manufactured in a variety of grades or structures determined by the relative volume percentage of abrasive grain, bond and porosity within a composite abrasive grain matrix. In many grinding operations, grinding tool porosity, particularly porosity of a permeable, or an interconnected nature, improves efficiency of the grinding operation and quality of the work-piece being ground. Porosity inducers, such as bubble alumina and naphthalene, may be added to abrasive composite mixtures to permit pressure molding and handling of a porous uncured abrasive article and to yield an adequate volume percent porosity in the final tool.

Natural porosity arising from packing of the abrasive grains and bond particles during pressure molding is insufficient to achieve a porosity character that is desirable for some grinding operations. Pore inducers have been added to achieve high porosity percentages, however, open channels or interconnected porosity cannot be achieved with the pore inducers known in the art (e.g., hollow ceramic or glass spheres). Some pore induces must be burnt out of the abrasive matrix (e.g., walnut shells and naphthalene), giving rise to various manufacturing difficulties. Further, the densities of pore inducers, bond materials and abrasive grains vary significantly, often causing stratification of the abrasive mix during handling and molding, and, in turn, loss of homogeneity in the three-dimensional structure of the finished abrasive article.
The volume percent of interconnected porosity, or fluid permeability, has been found to be a more significant determinant of grinding performance of abrasive articles than mere volume percent porosity. U.S. Pat. No.-A-5,738,696 to Wu discloses a method for making bonded abrasives utilizing elongated abrasive grain having an aspect ratio of at least 5:1. The bonded abrasive